IN THE CIRCUIT COURT OF THE STATE OF OREGON
FOR THE COUNTY OF MULTNOMAH

The Estate of JESSE D. WILLIAMS, Deceased, by and through MAYOLA WILLIAMS, Personal Representative, Plaintiff, vs. PHILIP MORRIS INCORPORATED, Defendant.	Vol. 19-A Circuit Court No. 9705-03957

A.M. TRANSCRIPT OF PROCEEDINGS

BE IT REMEMBERED, That the above-entitled matter came on regularly for Jury Trial and was heard before the Honorable Anna J. Brown, Judge of Department No. 7C, of the Circuit Court of the County of Multnomah, State of Oregon, commencing at 9:00 a.m., Thursday, March 18, 1999.

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Reported by Jennifer L. Wiles, CSR, RPR.

APPEARANCES:

James Coon, Attorney at Law,
William Gaylord, Attorney at Law,
Ray Thomas, Attorney at Law,
Christopher Tauman, Attorney at Law,
appearing on behalf of the Plaintiff;

James Dumas, Attorney at Law,
Michael Harting, Attorney at Law,
Billy Randles, Attorney at Law,
Walter Cofer, Attorney at Law,
Jay Beattie, Attorney at Law,
Pat Sirridge, Attorney at Law,
appearing on behalf of the Defendant.

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(March 18, 1999)

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A.M. P R O C E E D I N G S

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THE COURT: Good morning, jurors.

JURORS: Good morning.

THE COURT: We are ready to continue now with the cross-examination of Dr. Ludmerer.

Mr. Thomas.

MR. THOMAS: Thank you.

DR. KENNETH LUDMERER

was thereupon called as a witness on behalf of the Defendant and, having been previously duly sworn, was examined and testimony continued, as follows:

CROSS-EXAMINATION

BY MR. THOMAS:

Q. Good morning, Dr. Ludmerer.

A. Good morning.

Q. I don't think I have introduced myself to you, but I'm ray Thomas, and I represented the Estate of Jesse Williams in this case.

Did you bring a file or resume or a

curriculum vitae with you from St. Louis?
A. No.
Q. Do you have any, I guess, billing documents or materials to help me just see how much you have billed and what you have charged and those kind of things?
A. I have no documents.
Q. Did anybody instruct you to leave your documents at home?
A. No.
Q. Well, I'm just going to have to go back then to some things that I want to follow up on from yesterday.
You spent a thousand hours reviewing scientific literature, I think you testified yesterday; right?
A. Primarily, the scientific literature, but also I also indicated secondarily literature as well. The entire project was approximately 1,000 hours.
Q. And did that include reviewing what have come to be known as the Hill & Knowlton or H&K documents about the formation in the early years of the Tobacco Industry Research Counsel?
A. No, it does not. In fact, I don't know

what the documents are that you are referring to.
Q. Did anybody from the tobacco company ever suggest to you that before you came out here to testify you might want to look at what those Hill & Knowlton documents might say about what was happening within the tobacco industry at the time that some of this scientific information was being developed?
A. No, they did not. And actually, that would have been an entirely different project from my original assignment, which I testified about today, which was the state of scientific knowledge and the medical community from the 1930s through the Surgeon General's report to start looking at internal company documents and advertising and public relations, as you're suggesting, was an entirely different project, and I was not asked to do it. Quite frankly, I don't think I would have had a particular interest in doing that.
Q. Well, in regard to the project that you spent the thousand hours on, was that something that was commissioned or you said it was an assignment, was that an assignment from a tobacco company?
A. It was a self-directed assignment that I

did in conjunction, not with the tobacco company, it was done with one of the legal firms that does represent tobacco companies.

Q. Okay. Well, let's just make it clear. It was done with the legal firm that represents tobacco companies, but it was done on behalf of the tobacco company? It wasn't something that just coincidentally --

A. Perhaps I can explain to you the circumstances of that project.

Q. Okay. That is fine. But here's the situation for just you and I. I'm going to try to limit this to a half hour. If I'm still asking you a question, would you please not interrupt me, and I'll try not to interrupt you?

A. Okay. It's just my inexperience of being a witness.

Q. Okay. Well, would you please try not to interrupt me, and I'll try not to interrupt you? Okay?

A. Yes.

Q. All right.

Now, just so that it's clear from what you said, it wasn't coincidental that the tobacco industry lawyers asked you to do this; it was a

project undertaken on behalf of their client, a tobacco company; correct?

A. I think that misrepresents the actual circumstances of the project. It was a project that was done at my direction. And in doing the project, I insisted on having total control of the project.

I insisted at the beginning that I would not undertake it unless I determined from the parameters of the project how it would be approached, that I would do it the same systematic, thorough, comprehensive fashion that I do all of my research, that I make no guarantees as to what the findings would be, that I would assume total responsibility for the project, as I do for my own research. This is not -- it was not done in any other fashion.

Q. What I asked you, sir, was if it was done on behalf of the tobacco company; in other words, it was the tobacco company that paid the bill for the time? That is all I'm trying to get at?

A. I presume, it was, yes.

Q. Well, did you see your check?

A. Yes, I did.

Q. Your series of checks; right?

A. There were a series of checks.
Q. And did they come from a tobacco company or from the law firm?
A. They came from the law firm.
Q. Okay. Now, there were no strings attached to this?
A. Correct.
Q. Well, let's say if you had come up with a conclusion that was unfavorable to the interests of the tobacco company, was your subject something that was going to appear in a peer-review historical journal?
A. There was no determination of that.
Q. Well, let's put it this way. Have the opinions that you testified about yesterday appeared in a peer-review historical journal for evaluation and examination by your colleagues in the field of history?
A. I have not published this material.
Q. Well, in regard to other work that you have done, in terms of the tobacco industry, have you published any peer-review historical or medical analysis regarding cigarettes and health as the primary topic?
A. This is the only project that I have done

with relation to a law firm that represents tobacco. I have not published any papers or books dealing with tobacco.

Q. Okay. Well, let me see if I have got it right about some of the things that you said yesterday.

I think you said that in 1964 or at least after 1964, and I wrote this down, and I'm not sure I got it right, there was a quieting down of the controversy relating to smoking and health?

A. Correct.

Q. And you said, I think, that it's established in sort of the epidemiological development a goal standard; is that right?

A. The work relating to tobacco and health, that we discussed yesterday, was essential, not only in showing that there was a relationship between cigarette smoking and lung cancer, but in my view it was even more important because it stimulated for the first time in the history of medicine the development of this particular new field, the use of the epidemiology of chronic diseases, the use of statistical methods to evaluate causation and chronic disease, and this new field emerged with the as part of the tobacco

controversy. So that with the Surgeon General's report in a sense we have the birth of a new field which has become a very important medical discipline. It was born at this time, and we now have techniques that were first used with tobacco that had now been used to establish to study many other diseases, as well.

Q. Thank you.

In with regard to some of the things that you talked about, you said that there were some retrospective studies that were used to determine the epidemiological link between smoking and lung cancer; correct?

A. That's correct.

Q. And we talked about and you used the word "controversy" yesterday. I'm going to show you -- you have examined the Surgeon General's report from 1964, have you not?

A. Yes, I have.

MR. THOMAS: Counsel, I'm going to show on Page 27.

BY MR. THOMAS:

Q. Just in terms of whether or not there was a controversy or not, I'm going to read to you, and this is the Park Rose High School library, a copy

of this, part of the analysis was based upon population studies; right?

A. Correct.

Q. And population studies were important in terms of establishing the connection between cigarette smoking and health; is that correct?

A. Correct.

Q. Well, I would like to just -- maybe you could just come down? Would you come down and stand beside me, please? And I'm going to read this section.

Why don't you come and stand by me?

A. Can I just take a look at what section you are in?

Q. Sure. But I'm a little afraid you are going to lose my place, but go ahead. It is the kinds of evidence. I'll show you. It's Page 27.

A. Okay. I see.

Q. All right.

In terms of what was known before '64, I'm going to read this paragraph right here.

"In retrospective studies," that is the kind of studies you described; right?

A. That was the first set of studies that began in 1950 looking backward.

Q. "The smoking histories of persons with a specified disease, for example, lung cancer, are compared with those of appropriate control groups without the disease. For lung cancer alone, 29 such retrospective studies have been made in recent years. Despite many variations in design and method, all but one which dealt with females showed that proportionately more cigarette smokers are found among the lung cancers published than in the control population without lung cancer."

A. That's correct.

Q. That was a correct statement, was it not?

A. Yes.

Q. There weren't any retrospective studies as of 1964 that were examined here that resulted in a conclusion that there was no connection between men smoking and lung cancer, were there?

A. As I have said, one of the powers of the retrospective studies that was that they were consistent, so that they all had very similar effects, which cause many people to worry and do more studies and confirm them. And, yes, they were very similar in their qualitative evidence, and that is a correct statement.

Q. Would it be fair to say that in terms of

the retrospective studies there was not a controversy about the findings from these 29, actually it was 28 because one dealt with the female, about the connection between smoking and specifically lung cancer?

A. I believe that question does not accurately characterize the Surgeon General's report and the meaning of the report.

If you read the Surgeon General's report, which I have many times, it emphasizes the point that ultimately judgment and science, in any matter, not just lung cancer or cigarette smoking is that, a question of judgment.

So, if you look at the retrospective studies, they shocked the scientific world, this seemingly innocuous habit, two-thirds of adult Americans are still smoking, might be dangerous.

The retrospective studies were consistent in their results. The findings were consistent. The question was: What do they mean? What is the interpretation? Is this a simple statistical association that has no cause and effect, and the same way you can show a statistical association between lung cancer and the spreading use of the automobile, or is there something more in these

results that it might ultimately lead to further evidence that could show a cause and effect relationship.

So, the findings were agreed on. The controversy debate and discussion that among within the scientific community was: What do these findings mean? What types of additional studies do we need to do to determine what these findings mean?

Q. Okay. Thank you.

Now, in regard to the conclusion section, I'm just going to skip ahead a couple of pages. All right.

I apologize on to the jury if this isn't completely big enough to read.

But in regard to the findings -- whoops. There. The effects of smoking, principal findings.

"Cigarette smoking is associated with a 70-percent increase in the age-specific death rates of males;" is that right?

A. Correct.

Q. All right. Now, you could resume or go back to the stand.

And you can see, I believe, this one on the judge's monitor because I'll make it big.

This is Exhibit 5. It's the Frank Statement. And there is a historical statement here. And it's that one that I have the red on. It talks about allegations about tobacco. Now, we are talking about cigarettes, however, in the Frank Statement; right?

A. Correct.

Q. "One by one, these charges have been abandoned for lack of evidence."

Well, allegations about smoking and lung cancer, those weren't abandoned for lack of evidence, were they?

A. No, they were not, obviously.

Q. Now, you did read the Frank Statement?

A. Yes, I did.

Q. Did you ever read anything by the tobacco industry saying that, well, you know, oh, that Frank Statement, yeah, back there in '54, well, we said they were all abandoned; looked like things changed; we really weren't right on that one? Did you ever see them come out, come up with a correction or --

A. I have never studied anything from the standpoint of the tobacco industry behavior or internal documents.

My assignment, if you will, my project that I'm reporting on was the scientific and medical literature what was going on in medical science during this period. And I have no information at all in terms of what the tobacco companies thought or did or said.

Q. All right. Well, in terms --

A. Other than the Frank Statement, which I have read.

Q. Okay. In terms of what was known and not known or agreed or not agreed, in 1958, for example, were you aware that there was a visit to the United States and Canada by a group of British scientists who came over here and interviewed people in the scientific community and in the tobacco industry about the relative certainty that those people in the industry in the community had about the connection between cigarettes and cancer?

A. I have no knowledge of such a visit. As I have already indicated, I have not studied anything at all of the history of the tobacco companies or tobacco industries.

Q. Well, I'm going to show what is Plaintiff's Exhibit 28, and it's already been shown to the jury.

Now, this is what's called, and I'm just going to instructed you on it, I guess, a little bit, this is what's called a redacted document.

A. I'm sorry, a what?

Q. Redacted. It's a term for court, and it means that a part of the document has been ruled not to be considered by the jury or to be in evidence, but a part has been ruled to be in evidence.

And so I'm going to focus your attention on those parts which have been determined to be in evidence for consideration in this case. And I'm going to ask you if you agree or disagree with a couple of things that are in this report.

First of all, sir, I would like for you to assume for purposes of this series of questions that, in fact, Philip Morris was visited and that they were on the itinerary for this, and that scientists within their company were talked to as a result of this trip.

First of all, the question or one of the questions to be asked in 1958 was the extent to which it is accepted that cigarette smoke causes lung cancer. And you can see that on the Judge's monitor there. I know it's kind of small, but that

is what it is.

And in terms of what they found, in terms of what is the, quote, "controversy," unquote, I'm going to read it to you. You can perhaps follow along with me.

"With one exception," and I'm going to represent to you that M.S.N Greene was not with at least Philip Morris, "the individuals whom we met believe that smoking causes lung cancer if by, quote, 'causation' we mean any chain of events which leads finally to lung cancer and which involves smoking as an indispensable link.

"In the U.S.A. only Berkson, apparently is now prepared to doubt the statistical evidence and his reasoning is nowhere thought to be sound."

Now, do you disagree or agree with that as a state of affairs in 1958?

A. I'm sorry. Disagree or agree with?

Q. With the statement that in the U.S.A. only Berkson apparently is now prepared to doubt the statistical evidence and his reasoning is nowhere thought to be sound?

A. That statement is a highly inaccurate statement with the actual state of the knowledge at that time.

Q. All right.
A. It does not accurately reflect the dialog and discussion that was going on in the scientific community at that time.
Q. I'm going to ask you if you disagree or agree with two more statements that again are redacted, which means that they are available for our review and are in evidence.
"Otherwise, we found general acceptance of the view that the most likely means of causation is that tobacco smoke contains carcinogenic substances present in sufficient quantity to provide lung cancer when acting for a long time in a sensitive individual."
Do you disagree or agree with that statement, as of 1958?
A. It's difficult for me to see that statement.
Q. Oh, I'll show it to you. Right here.
A. Is this the visit to Philip Morris scientists?
Q. This is the visit by British scientists to the United States and Canada, which included Philip Morris scientists and their people on its itinerary, as well as a number of other people who

were in the scientific community and in the tobacco industry in the United States and Canada.

A. And if you would, please, restate your question for me now?

Q. Do you agree or disagree with the statement that I just handed to you? And after you read it, I will put it back on the monitor.

A. It's difficult for the historian to render an assessment of a little snippet. All of my historical training says, A, be comprehensive, and also know much more about the document, the circumstance of the document and who wrote it and for what reason and how it was received.

You know, just seeing this is kind of second or third-hand. I don't know who wrote it. I don't know who they talked to. I don't know if they intentionally selected the scientists who had one view and ignore the scientists who had another view. But I do know that it is that the state of scientific knowledge in 1958 was that it was an open question as to whether lung cancer was caused by cigarette smoking with many people, probably the majority of the people numerically at that time, believing the evidence was sufficient, but with a substantial and highly respectable minority with

some of the particularly distinguished names, like Dr. Fisher who had not accepted that yet.

Q. Thank you.

Now, in regard to the final conclusion, and, again, this is part of the same document, based on the same visit in 1958.

"Although there remains some doubt as to the proportion of the total lung cancer mortality which can fairly be attributed to smoking, scientific opinion in the U.S.A. does not now seriously doubt that the statistical correlation is real and reflects the cause and effect relationship."

As of 1958, would you agree or disagree with that statement about the --

A. I would definitely disagree with that statement. Whoever wrote it, and I don't know who wrote it and what that person's opinions were and how many or how few individuals he spoke with or she spoke with or what the biases or prejudices of those individuals were or what individuals or scientists that person did not speak with.

I don't know anything about the visit. As a historian, I can't make -- I can really make nothing about one little snippet when I'm

accustomed to looking at millions of documents in the project and putting things together.

I can say that that statement did not accurately reflect the state of knowledge. It was an inaccurate description of the state of knowledge.

I have reviewed the world scientific information at that time, and the statement that you put up now is an inaccurate assessment of that.

Q. All right. Well, before we go on, I'm just going to show you the itinerary in terms of who they talked to because you did ask about that.

American Tobacco Company; Medical College of Virginia, Richmond; Duke University; L&M, that is a tobacco company; Philip Morris; A. D. Little; TIRC, that is the Tobacco Industry Research Council; Roswell Park Memorial Institute.

And I'm going to speed up now. Are you ready.

Yale University; Biological Research Institute, Inc. of Cambridge; Rosco Jackson Laboratory; The Industry Technical Committee of the TIRC; The National Cancer Institute; John's Hopkins Hospital; Sloan Kettering.

Have you heard of them?

The people in the Toronto?
I mean, that is a pretty wide itinerary, isn't it?
A. Yes. They went to many reputable and distinguished places.
Q. All right. Thank you.
Do you agree -- and you don't have to get up because I think the jury will remember it, it was that first chart. Here we go. Thank you.
That you and Mr. Randles did. And remember, it had scientific knowledge on the one side and common knowledge on the other?
Well, would you agree with me that scientific knowledge tends to have an impact on common knowledge?
A. I would agree that over the long run it does. Certainly, there is no necessary correlation between the two. Sometimes there's a lot of common wisdom about something that is not based in fact. Over the long term, it probably does. But that is not to say anything about the short term. And certainly they are two different beasts entirely.
Q. Well, would it be fair to say that if a person or an organization was to compile a list of scientific knowledge and distribute it to opinion

leaders in the country that might have an effect on common knowledge about a scientific issue?

A. Certainly could, particularly if the opinion leaders spoke publicly about it. If you have a private meeting, I doubt that is going to effect the common knowledge. But certainly it could. That is not to say it would, but it certainly could.

Q. So, for example, if the tobacco industry group released a document called "A Scientific Perspective On The Cigarette Controversy, in 1954, and distributed it very widely, 205,000 of these things printed and sent to opinion leaders throughout the country, such a document might have an impact on the common knowledge and beliefs that people have about the link between smoking and lung cancer; right?

A. Could you rephrase that question, please? I didn't quite follow it all.

Q. All right. If the Tobacco Industry Research Council in 1954 sent a document, this is Exhibit 13, 205,000 of these things called "Scientific Perspective On The Cigarette Controversy," to the opinion leaders in the United States in 1954 that might have an impact upon what

became common knowledge about the link between cigarettes and cancer?

A. I'm really not an expert in public awareness and things of that sort. It does strike me that there's some inaccurate premises in your question. And --

Q. In terms of whether or not a large scale mailing with a title about "A Scientific Perspective" would or would not likely have an impact upon public opinion -- can you just let me finish, please -- can you tell me whether or not there is a possibility that such a large-scale mailing would have an impact or not?

A. Certainly, there is a possibility of that. Anything is possible.

But, if I may explain my answer, you have to put it in the whole context.

No. 1, there is a huge scientific undertaking on the science of the question by some of the best scientists in the world that is going on through its own momentum.

No. 2, this is being widely reported in all of the press. So, if one is taking -- you know, trying to assess public awareness, and I'm not a public awareness expert, but certainly, as a

historian, you have to try to look at everything that is going on. And there is wide-spread reporting of this scientific controversy, television and radio, Reader's Digest, and other magazines, and in newspapers around the country.

I think it's only natural to presume that the tobacco companies are going to be interested. It's kind of understandable that if they are going to be particularly interested at this time and in views that are more cautious in terms of health risks in terms of any relationship between cigarette smoking and lung cancer, you know, they are going to take the most favorable, legitimate interpretation of the evidence of the day.

But if you are trying to ask what's going to influence the public understanding, it's the totality of all of this. It's not just one mailing of one document, but day after day after day, week after week after week, all of the reporting by Edward R. Merle and the news and the television and the radio.

And again, I'm not a public awareness expert, but if you're asking me as a historian what's going to influence public awareness, it would seem to me it's again it's the totality of

everything that is being reported.
Q. Fair enough.
Now, based upon, let's move forward in time to 1964. This was the time period when the goal standard was established and the controversy died down in your testimony of yesterday; correct?
A. I think it would be a little more accurate to say a new goal standard was established. Certainly no one through out the experimental standard which had been the dominant standard for five centuries of medicine remains today. I think it might be more accurate to say a new standard stand with experimental standards emerged. And the public controversy certainly didn't -- certainly died down.
And, of course, the Surgeon General's report lead to warnings on cigarette packages so every smoker, every time you light the cigarette, you are going to see the warning on the package that you have made an informed choice and, you know, it's up to you.
But certainly there are many unanswered questions that continued to be investigated. And there are different points of view, and there were still those who remain uneasy at the fact that the

experimental data isn't in. What does this mean? What does this tell us about cancer, about biology about epidemiological methods?

So a lot of investigation and discussion. We know much more about lung cancer and cancer in general today than we did in 1964. But certainly, as a public health risk, the controversy died down, and certainly we are way in 1999 are comfortable using statistical methods to evaluate chronic disease in a way individuals in the '50s and '60s were not because those techniques were being invented then and people were applying them for the first time.

Q. All right.

So, my question is then, from a scientific perspective, and I'm going to show you Exhibit 50, which is dated 1964, the date or the year in which the Surgeon General's report came out, I'm going to represent to you that this is in evidence and is a letter within the upper echelon of Philip Morris executives, is -- and this is going to be sort of a long question, but is providing smokers a psychological crutch and a self-rational to continue smoking the kind of behavior that you described about three answers ago

when you said that certainly a company would put its best scientific face forward in regard to the controversy -- and I guess this is the real question -- giving smokers a psychological crutch and a self-rational to continue smoking, based upon what was then known in the conclusions in the 1964 Surgeon General's report, from a scientific perspective, a responsible endeavor on the part of the tobacco company like Philip Morris, knowing what they knew as of 1964?

A. Well, if I may, I would like to say -- make two points in response to that question.

First of all, as a historian, I can't answer that question. It's one little document. It would violate all of my training as a historian to try to draw the history, a story, from one little paragraph.

Again, what is the context? Who wrote it? Why did they write it? How was it received? For all I know, someone may have written back and said, you know: Stupid idea; let's drop it.

So, I can't really draw any conclusion about what the companies did or didn't do or what they thought or didn't think from that little snippet. It would be in violation of the

historical integrity to do so.

But the second point is that we do know that the Surgeon General's report directly led to warnings on the cigarette packages. So, from that perspective, the cigarette companies were taken out of it by that point. Smokers were -- you know, certainly had the warnings on the packages.

Q. By 1964?

A. I said that the report led directly to the warnings. Certainly, it took a little while for the warnings. The warnings were not yet on the packages, but the Surgeon General's report led to the warnings.

Q. Have you, as a part of your analysis, conducted any study at all of what percentage of smokers or non-smokers believed about the connection between cigarettes and lung cancer either '64, '70, when the warning came out, '80, have you done anything like that?

A. No, I have not. That is far out of my area.

Q. So, your testimony about four or five minutes ago about what people knew or didn't know wasn't based upon your study; right?

A. It was -- which question are you

referring?
Q. Oh, there were the warnings and people knew this and people knew that, what people -- common people, non-scientific people knew? It wasn't based upon your scientific study that you conducted on behalf of the tobacco company?
A. I'm just trying to answer your questions, most of which have not dealt with my testimony. I'm just trying to answer them as well as I can. I am not an expert in public awareness. Let's make that clear.
I'm a medical historian. Certainly, there was an enormous amount of publicity and attention to the findings about the controversy.
But yes, you are completely correct. I'm not an expert in public awareness, and I don't have the skills to study that as someone who is trained in the field could do. And I have taken no study myself to assess what Mr. Smith or Mrs. Jones in the street might have thought or might not have thought at any point in time. That is completely correct. That is not my area of expertise.
Q. Well, in regard to a continuing scientific controversy or lack of controversy, I'm going to represent to you that the Tobacco

Institute, as recently as 1982, put out information about a scientific perspective on the connection between smoking and cancer.

Did you read any of these materials in preparation for your testimony today?

A. No, I did not. As I indicated, my formal preparation, if you will, ended in January of 1964 with the Surgeon General's report.

Q. Well, isn't it correct, however, that while maybe your formal preparation ended in 1964, yesterday you told the jury a number of things about what happened after 1964? That there was a reasonable basis for concluding or at least that you would not risk disrespect a person, based upon the scientific knowledge available today, said that there was not sufficient basis to believe that cigarettes smoking causes cancer? You testified about that yesterday, didn't you?

A. Correct.

Q. Well, if you were to examine the controversy, as recently as 1982, from a scientific perspective, would it be fair to say that at least by 1982 certainly there really wasn't much of a controversy about an established link between cigarette smoking and lung cancer?

A. First of all, in terms of your time, I would like to reiterate that I systematically studied the world scientific literature through 1964. I have read many secondarily sources about tobacco and epidemiology and lung cancer as part of my preparation. And, of course, as a physician, I went to medical school. I continued to read. I teach medicine. So, I have familiarity. I have not systematically studied the literature year by year, month by month, paper by paper.

I think it is -- the most accurate answer is that the world view changed. As time goes on, you have the '60s, the '70, the '80s, we became -- by we, I mean the scientific community, by now is much more accustomed to using statistical evidence. This is what I was taught in medical school, and I accept it and tell that to my students today.

On the other hand, we have a five-century long tradition of -- that demands experimental verification to demonstrate cause, and that is a pretty important tradition, too, even today.

And the fact is that, to the best of my knowledge, experimental evidence has not yet brought forth in the same way that we have statistical evidence. So, this dilemma continues

today.

What's different is that we now have a new world view. Most scientists are comfortable using statistical information. That is not to say that it's unreasonable to have a different standard of proof. Everyone, I believe, recognizes that cigarette smoking is dangerous for your health. Everyone including those that I'm aware of who --

Q. Excuse me, Doctor. Are you talking about --

A. The scientific community.

Q. Oh. Okay.

A. The scientific community.

Q. All right.

A. You know, what we teach in medical school. We tell our patients, all of us tell our patients not to smoke. We all recognize cigarette smoking to be a major public health risk.

But when we sit down among ourselves in our seminars, in our conference rooms, in our offices, in our doctor's lounge, and say: Has experimental evidence really come in yet? Well, it hasn't. And some people are willing to, the majority, myself among them, are willing to say, you know, I accept, you know, I'll accept

causality, based on statistical information, but it's not my opinion to say it's unreasonable to say, you know, from a theoretical standpoint we haven't proved it, because where is the experimental evidence? That discussion continues. And in my view it's an important discussion, because I think when it is resolved we are going to learn a lot. That is going to help with us lung cancer and other types of cancer, as well.

Q. Isn't it correct, Doctor, that people in the scientific and medical community have a considerable responsibility to those of us who are lay people to be careful about the things that they say which might be interpreted by lay people to indicate that it hasn't been proven that cigarettes cause cancer, and, therefore, for example, it's an open question; we don't know, and I can continue to smoke without fear?

A. I didn't quite follow all of that. Will could you please repeat the question?

Q. I'll try again. Isn't it a pretty big responsibility that people in the scientific community have or, for that matter, people who would report the results of what happens or is believed in the scientific community, because for

us lay people when somebody says it hasn't been scientifically established that smoking causes lung cancer, for those of us who don't have the scientific and medical training to be able to distinguish between epidemiological studies, on the one hand, and what happens in the laboratory on the other hand, we might conclude well, it hasn't been shown that smoking causes lung cancer, and I can continue to smoke without fear?

A. Well, there are several questions that I perceive in the question that you asked.

Yes, in my general personal opinion, we in medicine and science have an enormous social responsibility to report and popularize the results of scientific inquiry in a responsible fashion.

Number 2, insofar as how the public responds to any statements, which was also part of your question, I don't know. As you already yourself pointed out, I'm not an expert in public awareness and in how people respond.

So, even with the best scientific reporting and science teaching in elementary school and high school and college, how well and effectively the message would be brought across, I don't know. That is out of my area.

And then the third part of it is that I want to emphasize that discussions continue today to what causes lung cancer and where is that experimental proof?

But to say that something has not been proved to be a cause is much different than saying I don't know of anyone who has said that cigarette smoking is safe.

And secondly, I don't know of, you know, anybody in the scientific community who has encouraged people to smoke because experimental evidence is not in.

Those acquaintances of mine who might be more traditional and want experimental evidence and might even be looking for it themselves are just as strong in their viewpoint as I am and the rest of us are that smoking is a public health danger, and we advise our patients not to smoke.

Q. Thank you.

Now, and I guess it goes without saying, certainly, you don't tell your patients in your clinical practice that you can smoke without fear because there has not been developed a laboratory testing that has conclusively demonstrated with confidence that cigarettes cause cancer, do you?

A. I have never told a patient to smoke, and I have told every one of my patients in my career in medicine that does smoke that it would be wise for them not to smoke.

Q. And it would also not be responsible corporate behavior, would it, for a tobacco company to put out, through its Tobacco Institute, as recently as 1982 a booklet for common people, lay people, to examine called "Cigarette Smoking and Cancer," which would contain a suggestion that the proof just isn't in? Would that be responsible?

MR. RANDLES: Objection. Beyond the scope beyond this witness's expertise.

THE COURT: The objection is sustained.

BY MR. THOMAS:

Q. From a scientist's perspective, in 1982 was it a fair, honest summary of the scientific community's view in regard to smoking and health for the Tobacco Institute or a tobacco company to say, quote, "The assertion that cigarette smoking is the cause of lung cancer ignores basic unresolved questions about the laboratory data, smoking patterns and mortality rates, diagnostic variations, and other confounding factors"?

MR. RANDLES: Your Honor, may we

approach?
THE COURT: Yes.
Jurors, I'm sustaining Mr. Randles' objection to the last question. Disregard the question. It is stricken.
Proceed.
BY MR. THOMAS:
Q. Would it be responsible as late as the 1980s for a tobacco company to put out information to common people, to lay people, about the failure by science to establish a causal link between smoking and cancer?
MR. RANDLES: Objection. Beyond the scope. No foundation. Beyond this witness's expertise.
THE COURT: The objection is sustained. The witness is not qualified to speak in terms of what is responsible for a tobacco company.
Objection sustained.
BY MR. THOMAS:
Q. Would it be leading to what you called yesterday the invigorating controversy for a tobacco company to put out information suggesting that there was not established a scientific causal link between smoking and lung cancer, as recently

as the 1980s?
A. Is it responsible? Is that your question? Or -- I didn't. Could you repeat that, please?
MR. THOMAS: I don't know if I could ask Jennifer to?
* * *
(Whereupon, the court reporter read the pending question back to the witness: WOULD IT BE LEADING TO WHAT YOU CALLED YESTERDAY THE INVIGORATING CONTROVERSY FOR A TOBACCO COMPANY TO PUT OUT INFORMATION SUGGESTING THAT THERE WAS NOT ESTABLISHED A SCIENTIFIC CAUSAL LINK BETWEEN SMOKING AND LUNG CANCER, AS RECENTLY AS THE 1980s? After which the proceedings continued, as follows:)
* * *
THE WITNESS: Not having seen the document you are referring to, I have to qualify any answer that I might give.
Permit me to say -- make two points in response to that.
No. 1, the specific point that in the 1980s it was a very accurate statement to say that the experimental evidence was not in, and,

by that standard, cause had not been proven; epidemiological evidence was in, by that standard, cause has been proven. And most people today accept epidemiological standard.

No. 2, in general, as a scientist and an educator, I'm very concerned and troubled about the low level of scientific understanding in the general public. Some of my colleagues report to me that they have gone to Congress to testify for NIH budgets, and something of the range of two-thirds of our Congressmen cannot tell you what a cell is.

I believe that any steps that can be taken to educate the public in a responsible fashion about science where there is having high-quality teaching of science in our high schools, in our junior high schools, perhaps even better study in the elementary schools, or having continuing education, if you will, on any subject about fundamental scientific principles, speaking in general, to my mind, that is good.

But I want to emphasize that I'm speaking as giving a personal view. That certainly is not a professional, historical medicine type of statement, as I testified on yesterday.

Q. Well, from that perspective, Doctor, isn't it true that knowing that lay people don't have a real good understanding of a lot of complicated scientific principles, is a reason that, while the invigorating controversy in the scientific community might be invigorating for the scientists, if only part of the controversy is taken and shown to the American people or composed of people who don't have a scientific understanding, it may very well lead them to make decisions about personal health which are not in their self-interest, isn't that right?

MR. RANDLES: Your Honor, beyond the scope. Again, beyond the area of this witness's expertise.

THE COURT: It is argumentative.

You don't need to answer the question.

Proceed, please.

BY MR. THOMAS:

Q. And it's because lay people don't have such an advanced scientific understanding that it's important for people who would put forth scientific opinions not to just show a one-sided view of smoking and health; isn't that right?

MR. RANDLES: The same objection. And

it's argumentative.

THE COURT: Sustained.

BY MR. THOMAS:

Q. Would you agree that it is important because people don't have advanced scientific knowledge that a balanced view be put forth by anyone who would seek to publicize scientific knowledge, including a tobacco company, about the connection between smoking and lung cancer?

A. Well, certainly I'm in favor of a balanced view, but it does strike me, again this is beyond my area of expertise, that one doesn't need to know a lot of science to know whether something is healthy or not. You don't have to know the laws of physics to know that if you do bungee jumping it's dangerous or if you do sky jumping it's dangerous.

And I would agree with you that scientific education is a good thing. I would agree with you that, very much that any individual, whether a junior high school teacher or college professor or an industry educating the public, putting forth a view, should do so in a responsible fashion.

But just speaking as a person and as a

physician, you don't have to know the underlying biology and scientific principles to know that cigarette smoking is dangerous.

Q. As a person, your opinion, however, is not based upon an understanding of what poles of smokers versus non-smokers have shown in terms of smokers' appreciation of the connection between smoking and lung cancer, is it?

MR. RANDLES: Objection. Beyond the scope. Beyond this witness's expertise.

THE COURT: The objection is sustained.

BY MR. THOMAS:

Q. Did I hear wrong? Did the research that you conducted which led to your opinions yesterday, the thousand hours, was that done ten years or so ago?

A. Correct, 1988 and 1989.

Q. And so you had ten years to take those opinions that you got, after a thousand hours of research, and put them into a paper, that could have been reviewed by your historical peers, and, yet, as of today you still haven't done that; is that right?

A. That's correct. 1988 and 1989, I was actually getting going on a new book which will be

published in September, "The History of American Medical Education from World War I Through The Present." That is where I wanted to put my energies and not to try to publish the paper relating to the tobacco controversy.

I'm an independent scholar, university professor, university physician, and I have my own research and writing agenda, and that is where I put my emphasis.

Q. Well, then wouldn't it be fair to say, Doctor, that in terms of the contribution that you made to what was known by the human race, based upon that thousand hours of work, at least if your present intentions are followed through, that is never going to be shared in a peer-review article with the rest of your historical colleagues; correct?

A. I have no inattention at this time of publishing this. And one reason that I feel that way is that has been done. There have been a number of articles about the smoking controversy and the events leading to the Surgeon General's report that say essentially the same thing as I did for you today, that in 1950 there was an explosion. There was a bomb. All of a sudden this innocuous

habit is thought to be dangerous, and scientists began investigating it, and new approaches were developed and methods were developed. It was debated in a collegian fashion. And it was culminated with a Surgeon General's report in 1964.

That theme has already been expressed in a number of publications, a number of papers, and the history of medicine literature. So, for me to take my time to write another paper would not be adding much to the knowledge. I would rather spend my time, my research time doing something unique, something that hasn't been done already.

I believe I could help history and help medicine more in that fashion.

Q. It's kind of like one of those things when you avoid something has already been shown before, is that it?

A. No, that is not correct at all. I did a careful study, using the same methods that I do for all of my work.

I have my own research agenda. The writing of some papers on tobacco didn't fall into it. And plus, a lot of similar papers had already been written. There wouldn't have been much to gain.

MR. THOMAS: No further questions.
MR. RANDLES: Very briefly, Your Honor.

REDIRECT EXAMINATION

BY MR. RANDLES:
Q. Doctor, did any question you heard here today change the opinions that you rendered to the jury yesterday?
A. No.
Q. Did you decide what material you would review for your historical research in preparation for your testimony?
A. Yes, I did.
Q. Did you come to your own conclusions?
A. Yes, I did.
Q. And I believe you mentioned you have written three books regarding medical historical matters; right?
A. Correct.
Q. The second one was nominated for Pulitzer Prize?
A. Correct.
MR. THOMAS: Objection. This has all been asked and answered.

MR. RANDLES: Just one question.
THE COURT: But let's not cover, in the interest of time, what you have already covered.
BY MR. RANDLES:
Q. Did you apply the same rigorous standards of historical research to this project as you did to your work on your books?
A. Yes. I was just as conscientious on how I did this particular project as I have been with anything I have ever done in the history of medicine.
MR. RANDLES: Thank you, Doctor.
No further questions.
THE COURT: Jurors, we are going to take a very brief recess. We are going to be taking the noon recess starting at 11:30 today. So I'll need you to just hold this recess to as brief a time as is necessary to use the facilities, and we'll have you back in shortly.
Please leave your notes on the chair. Don't discuss the case. Watch your step, please.
* * *
(Whereupon, the jury exited the courtroom, and the proceedings continued, as follows:)
* * *

THE COURT: Would you catch that door please, Mr. Tauman or somebody? Thank you.

Anything for the record?

Mr. Thomas, did you want to put on the record anything about our discussions at the bench here?

MR. THOMAS: The defense objected. The Court instructed me not to -- well, the Court sustained the objection. I tried three different ways to get the information that I was attempting to cross-examine on. I think I succeeded without objection the final time.

THE COURT: Oh. So you don't need to put anything else on the record?

MR. THOMAS: No.

THE COURT: Very good.

MR. RANDLES: I would just like to put two sentences on the record, that, once again, we had the same problem. A document was not in evidence, not shown to me, and Mr. Thomas began reading from it to the jury. I think that is unfair. And the Court has repeatedly admonished Mr. Thomas about that.

MR. THOMAS: Well, I'm going to let the Court --

THE COURT: Go ahead, Mr. Thomas.

MR. THOMAS: I'm not aware, and maybe I am going to learn, that non-evidence documents which have contents that I have a good-faith basis to question a witness about either knowing, agreeing with or disagreeing with, may not be summarized or quoted by me until the document is shown to my opponent. I have never had that.

THE COURT: Well, let me try to state the positive version of the rule.

Any exhibit received in evidence obviously is usable. Documents can be used for cross-examination, particularly for impeachment purposes.

There are documents about which there is controversy in this case. To the extent there has been a document marked, but not received, I don't want it read to any witness in the presence of the jury, without notice to me, so that if there is an objection we can deal with it outside the presence of the jury.

There are any number of scenarios under which a proper foundation can be laid for the use of documents in examining and particularly cross-examining a witness where the document

itself is not admissible in evidence, but can form the basis of questions on cross-examination.

I think we have got a pretty definitive universe of the documents about which there are sensitivity.

And in the interest of getting this case to the jury in one piece, I want to be very plain. Nobody should read from a document to which there has been already lodged an objection in the presence of the jury, unless it's brought to my attention ahead of time, so that we can deal with those.

MR. THOMAS: And I'll tell the court and Mr. Randles, as an officer of the Court, this was not such a document and there was no allegation made that it was.

THE COURT: Mr. Thomas, I'm not suggesting that it was. I'm trying to state in a positive way what I'm -- I'm trying to be helpful so that I can make the rules as clear as possible, without interfering with what is rigorous advocacy. And I'm not suggesting you have to show everything that you are going to cross-examine about to an opposing party.

I'm not being critical. I'm trying to

make a ruling in a plain and clear way so that everybody knows what the parameters are.

And I'm trying keep this case in one piece so that it gets to the jury.

Okay. We were off the record now.

* * *

(Whereupon, the proceedings continued, in the jury's presence, in open court, after the recess, as follows:)

* * *

THE COURT: Okay.

Bring in the jury, please.

All right, jurors.

Mr. Sirridge is back now to call the next witness on behalf of the defense.

MR. SIRRIDGE: Thank you, Your Honor.

Dr. Carl Fuhrman I'll call to the stand.

THE COURT: All right.

Would you step here to the witness chair, and remain standing, facing the clerk, please?

DR. CARL FUHRMAN
was thereupon called as a witness on behalf of the Defendant and, having been first duly sworn, was examined and testified as follows:

THE CLERK: Please be seated. And if I could have you scoot in a little bit toward the microphone, and just slightly over to your right. Be careful. Don't get too close to the edge there. Feel free to use the water.
And then please state your name. Spell your first name and your last name.
THE WITNESS: My name is Carl Fuhrman. It's spelled C-a-r-l F-u-h-r-m-a-n.
THE COURT: Thank you.
Mr. Sirridge.

DIRECT EXAMINATION

BY MR. SIRRIDGE:
Q. Dr. Fuhrman, what is your current professional position?
A. I'm a professor of radiology at the University of Pittsburgh School of Medicine.
Q. And, Doctor, I would like to go through

your educational a little bit.
Where did you get your undergraduate degree?
A. I received my undergraduate degree in mathematics and physics from the University of Pittsburgh.
Q. Did you receive any honors for that degree?
A. I graduated Magna Cum Laude.
Q. And where did you get your medical degree?
A. I received my medical degree at the University of Pittsburgh School of Medicine.
Q. Did you receive any honors in that program?
A. I graduated Cum Laude and was elected to Alpha Omega Alpha.
Q. What does that signify?
A. It is an honorary medical society which is reserved for the top ten percent of the graduating class.
Q. Did you pursue an internship after your medical degree?
A. I pursued an internship in internal medicine for one year.

Q. And where was that?
A. That was at the University Health Center of Pittsburgh, consisting of Presbyterian-University Hospital and the VA Hospital.
Q. Following your internship in medicine, did you decide to specialize in any area?
A. I decided to specialize in diagnostic radiology.
Q. And before we get started on in your training program in radiology, could you tell the jury what is the specialty of radiology?
A. Radiology is the specialty which is divided into two sections. Diagnostic radiology is involved with the diagnosis of many different conditions using x-rays and other imaging modalities, including ultrasound, including medicine, including CAT scanning, MRI, and other modalities.
Diagnostic radiology or therapeutic radiology is the branch of radiology which is reserved for the treatment usually of malignant diseases.
THE COURT: Excuse me, Doctor. Would you slow down just a touch?

THE WITNESS: Okay. Thank you.
THE COURT: Go ahead.
BY MR. SIRRIDGE:
Q. All right. Could you give jury an idea of how radiology works? How is it done, just in general terms?
A. Basically, patients are referred to us with requisitions from their referring physicians for a particular study. The study can be a chest x-ray, a barium enema, a mammogram, nuclear medicine, bone scan.
The patient arrives in our department. The examination is performed after evaluation of the patient, and an interpretation is rendered, and a written report is sent to the referring physician.
Q. All right. Dr. Fuhrman, have you held any academic positions in radiology?
A. Yes. In 1983 to 1988 I was an assistant professor of radiology. I was then promoted to associate professor of radiology, which I stayed at for approximately four or five years. And I was then promoted to a full professor of radiology at the medical school.
Q. All right. What are your professional

responsibilities at the University of Pittsburgh in the radiology department?

A. I'm chief of the division of thoracic radiology, which is involved with all aspects of chest radiology.

Q. And before that time, had you served as chairman of the department of radiology?

A. I was the head of the division of general radiology, which is a subdivision under a chairmanship.

Q. Okay. And in your position as chief thoracic or chest radiology, how many radiologists are in that group?

A. We have five full-time chest radiologists at the University of Pittsburgh.

Q. So, do you have a particular specialty within the field of radiology then?

A. Yes.

Q. And that is?

A. Chest radiology.

Q. Doctor, are you board certified in radiology?

A. Yes.

Q. And how does one become board certified?

A. One must complete an accredited residency

program during your senior year of residency. You must take a written examination and pass both the general radiology written examination, as well as a written examination in medical physics. After that, you are then qualified to take the oral examination in diagnostic radiology.

Q. And when did you complete that board certification, Doctor?

A. 1983.

Q. Yes. Are you also certified in occupational chest disease?

A. Yes. I have a "B" Reader Certificate.

Q. Doctor, in your position at the University of Pittsburgh School of Medicine, are you asked to undertake teaching duties?

A. Yes. I'm the director of undergraduate medical education in radiology for the entire medical school.

Q. And what kind of things do you do in your teaching role? What kind of courses do you teach? What kind of lectures do you give, that kind of thing, could you tell the jury that?

A. We can divide them into the medical student responsibilities, and my medical student responsibilities include teaching radiology aspects

of chest radiology to first-year medical students during the anatomy course.

I'm also responsible for directing the radiology portion of the chest and pulmonary section of the second-year medical student course.

And I'm in charge of the senior medical student required courses in radiology, which is required of all senior medical students and which is given six times during the academic year.

Q. And, Doctor, when you to use the term pulmonary radiology, is that specially the same thing has lung radiology?

A. It would also include some aspects of cardiac radiology, but yes, it would also include all of pulmonary radiology.

Q. In your teaching role, Dr. Fuhrman, at the university, have you received any teaching awards?

A. Yes, I have.

Q. And I don't want to embarrass you, but have you been elected Teacher of the Year Award?

A. Yes, I have.

Q. How many times have you received that?

A. From the residents of the University of Pittsburgh, I think approximately five times.

Q. And have you also received the President's Distinguished Teaching Award?
A. Yes, I have, in 1991.
Q. Doctor, are you asked to give lectures in chest radiology to different schools and universities in this country?
A. Yes.
Q. And are you also asked to give lectures in chest radiology to various universities and hospitals in foreign countries?
A. Yes.
Q. And when you give those lectures, do you generally talk about the different diagnostic issues of lung cancer?
A. Lung cancer is a frequently requested topic at the universities, yes.
Q. Doctor, do you belong to the American Medical Association and various state and local medical associations?
A. Yes.
Q. Do you also belong to the medical organizations that are restricted just to radiologists?
A. Yes.
Q. And are those elected memberships?

A. Some are elected memberships, yes.
Q. Give me an example of that?
A. The American College of Radiology.
Q. And are you also a member of specialty groups in the field of chest medicine and chest radiology?
A. Yes. I have been elected to the American College of Chest Physicians and the Society of Thoracic Radiology.
Q. And, Doctor, is there any special committee in the American College of Chest Physicians that you have been assigned to or appointed to?
A. I have been on the subcommittee for lung cancer.
Q. Doctor, do you have any scientific or medical publications in the field of radiology?
A. Yes, I do.
Q. How many do you have, approximately?
A. Approximately, 50.
Q. And do those involve articles in medical journals?
A. Articles in medical journals, book chapters, and other articles and seminars.
Q. And are the articles you publish in

medical journals are those in what are called peer-reviewed journals?

A. Yes.

Q. And what are peer-reviewed journals? Can you explain that concept to the jury?

A. A peer-review journal is a journal which you submit an article to, and that article is then sent around the country to other experts in the field who review the article, and, if they approve of the article, it is then accepted for publication.

In the University setting, the only publications which are considered when you are evaluated for promotion are publications which have been reviewed in peer-reviewed journals.

Q. Doctor, I would like to ask you a little bit about your daily work as a radiologist at that time hospitals.

Could you give the jury an idea of how many chest x-rays you review on a daily basis?

A. On a typical day, I would review approximately 80 to 160 chest radiographs, and on some days as many as 200 chest radiographs.

Q. Doctor, you used the term radiograph. How does that compare to what people know as a

chest x-ray?
A. They are the exact same thing.
Q. So, between -- normally between, did you say 80 and --
A. 160.
Q. -- 160. All right. With gusts up to 200?
A. Yes.
Q. How about what are called CT scans? First of all, explain to the jury what a CT scan is?
A. A CT scan is a specialized radiographic procedure which can be performed on almost any part of the body, the head, the chest, the abdomen, in which a patient is placed into a doughnut-shaped structure, placed on a table on their back, and then is moved through the scanner, and images are obtained in a cross sectional image, sort of like slicing the patient like a loaf of bread.
Q. Doctor, and how many of those do you review a day, chest CT scans?
A. In our division, we do approximately eight to 26 per day.
Q. Doctor, how much time do you spend practicing radiology, say, on a weekly basis?

A. 60 hours.
Q. And does that involve your teaching time, as well, and other administrative duties or is that extra?
A. That would include everything, yes.
Q. Is there any -- do you have any responsibilities in the field of lung medicine at the University of Pittsburgh in the sense of are you responsible for any lung centers or --
A. Yes. We have the Comprehensive Lung Center at the University of Pittsburgh, and I'm the director of radiology.
Q. What is involved in the Comprehensive Lung Center?
A. The Comprehensive Lung Center is a facility at our institution in which patients are evaluated for a variety of chest diseases; and, in the same geographic setting, can be seen by radiologists, pulmonologists, surgeons, medical oncologists, and radiation therapists, without having to go to a variety of different doctors for different appointments.
Q. And do you attend any clinical conferences from time to time with those same specialists, thoracic surgeons?

A. Twice a week, we have a joint combined multi-imaging modality conference which includes pathologists, the surgeons, pulmonary medicine, and radiation oncologists.

And I also give a one-hour lecture per week to the fellows in pulmonary medicine on chest radiology.

Q. What are the fellows?

A. Pulmonary fellows are people in internal medicine who have completed the three-year residency in internal medicine and are now specializing in pulmonary medicine, which is an additional three years after they finish their internal medicine residency.

Q. Dr. Fuhrman, I would like to ask you a couple of questions about the hospitals where you work as a radiologist.

Give the jury some sort of background about what kind of institutions they are. Could you give us an idea of the size of the hospitals where you work? For example, which hospitals are they and basically how big are they?

A. The hospitals that I practice on, on a daily basis, would be Presbyterian-University Hospital and the Montefiore Hospital in Pittsburgh,

which are connected physically by a bridge. The total hospitals, University Health Center of Pittsburgh number almost 20 institutions, and then our main facility we have approximately 2500 beds.

Q. Now, within those hospitals is there a cancer diagnosis and treatment center or how is that done?

A. We have the University of Pittsburgh Cancer Institute, which is one of the nationally recognized cancer institutes by the National Institutes of Health as a comprehensive cancer center in the country.

Q. Doctor, have you done scientific or medical research in the field of radiology?

A. Yes, I have.

Q. And what kinds of organizations have supported that research?

A. I have received financial support from General Electric, Kodak, the National Cancer Institute, and also the National Institutes of Health.

Q. And, Doctor, what subject area has occupied most of your time in the research area?

A. I'm very involved in the digital imaging of the chest using photo-stimulatable phosphorous.

Q. Are most of your research projects involving some aspect of chest/lung radiology?
A. Yes.
Q. I'm going to ask you a few questions about lung cancer.
Dr. Fuhrman, do you have any idea how many lung cancer cases that you have seen either chest x-rays or CT scans in your career?
A. Thousands.
Q. And do the different types of lung cancer -- the jury has heard some testimony about different types of lung cancer -- do different types typically have different appearances from chest x-rays in radiology?
A. Yes.
Q. And have you been involved in the diagnosis of all types of lung cancer?
A. Yes.
Q. Doctor, how often do you learn the medical information of a patient when you are asked to read the chest x-ray or the CT scan?
A. We are usually provided with a written requisition which includes at least a pertinent clinical history. For CT scans, all of our patients are evaluated by a nurse prior to the CT

scan, particularly to determine if the patient has any allergies or any problems that could occur during the scan. That information is available to us when we review the scans.

Q. Now, Dr. Fuhrman, are you charging for your professional time today to appear here?

A. Yes, I am.

Q. And what do you charge for your professional consulting time?

A. My rate is defined by my department. $150 per hour for consultations. And for deposition and court appearances it is $250 per hour, with a maximum of $1,000 per day, plus travel expenses. And I would note that any time taken way from the department must be taken as vacation time and is not supported by the department.

Q. So, you are talking some vacation time to come out here?

A. Yes.

Q. How many hours have you spent on this case?

A. In review of material, approximately 10 to 12 hours.

Q. Doctor, have you ever testified in a trial involving cigarette smoking or tobacco?

A. No.
Q. How many times have you testified in your career?
A. Approximately, three or four.
Q. Now, have you consulted on any other tobacco-related cases?
A. Yes.
Q. And how many of those?
A. Probably, ten to 15.
Q. Ten to 15 cases over what time period?
A. Ten year period, approximately.
Q. Now, what percent of your income or what percent of your time is devoted to reviewing cases?
A. Less than one percent.
Q. I would like to switch gears for a minute, Doctor, and go back to your teaching work and ask you do you discuss the relationship of cigarette smoking and lung cancer when you teach your medical students?
A. Yes, I do.
Q. What do you tell them about that relationship?
A. I teach two lectures on lung cancer, one in the second year of medical school and one in the fourth year of medical school. And the things that

I teach my medical students is that from 80 to 85 percent of lung cancers are directly associated with cigarette smoking, and that 15 to 20 percent of lung cancers have no association with cigarette smoking.

Q. So there must be some types or some types of lung cancer that are not associated with smoking?

A. There are some types of lung cancer that have a very high association with smoking, some types of lung cancer which have less of an association with smoking, and there are certain cell types of lung cancer which have no defined association with cigarette smoking.

Q. Doctor, I might say, if you need to take a drink, there is a pitcher and a glass there, at any point you get particularly dry.

Dr. Fuhrman, when were you contacted about this case?

A. In November of 1998.

Q. And what were you asked to do?

A. I was asked to review a series of chest radiographs, chest x-rays, and CT scans which were pertinent to this case.

Q. And what is your procedure in reviewing

those? How did you go about reviewing the films?
A. I have a very strict policy that I do not want to know any of the information which later develops in the case. I prefer to look at the films exactly in the chronology order with the information available at the time the examinations were obtained.
Q. And were you also supplied the medical records of the case?
A. Not at that time.
Q. And you were sent those recorded later?
A. I believe I was sent those records several weeks later.
Q. And you have reviewed those?
A. Yes, I have.
Q. How many times have you reviewed radiology in this case?
A. Three times.
Q. And I would like to ask a couple of background questions. We have talked some about radiology and what it is.
When radiologists look at chest x-rays for example, how do they tell if something on the chest x-ray is not right or is abnormal?
A. They have to have a precise knowledge of

what normal anatomy is on the chest radiograph.
You need to know all of the normal anatomic variances which occur in the population.
You also need to know how the chest appears at different ages in life.
The chest radiograph of a child is very different than a chest radiograph of a 70-year-old patient.

Q. Do you focus on the changes there and what do compare them with?

A. If we are fortunate enough to have old films for comparison, it's very important to determine if there's been any interval change in any anatomic structures on a chest radiograph.
If there are no old films for comparison, you have to do the best you can with the evaluation of the film that you have at the time.

Q. Now, in this case, Doctor, do you have earlier chest x-rays and films to compare with later?

A. Yes, we do.

Q. And before we review Mr. Williams' chest x-rays, let me ask you, Doctor, can radiologists have different opinions about the same x-rays?

A. Yes.

Q. Okay. Have you studied this issue in some of your research?
A. Yes. It's estimated that radiologists will disagree on some issues in about ten percent of the cases.
Q. Well, what, in your opinion, explains why qualified radiologists would differ on what is on a particular x-ray, the same x-ray?
A. The number one reason is the level of expertise in any different field that you're in. I think somebody who does chest radiology as a full-time living has a different insight into chest radiology than somebody who does it as part of general radiology, in addition to other studies.
Also, you can have problems in recognizing a lesion and then also problems in recognizing the significance of a lesion once you do recognize it.
Q. Doctor, we are going to have to do a little setup to use this machine over here. But did you bring some films with you that you normally use in teaching medical students?
A. Yes.
Q. Okay. And would those films be helpful to you in explaining some of the basic anatomy

structures of the chest?
A. I hope so.
Q. Okay. Doctor, I'm going to ask you to step down here and help me, along with Dan, here.
THE COURT: Mr. Gaylord, where ever you want to be, come down here or over there.
MR. GAYLORD: I think for the moment, I may be all right.
I want to say, he asked me about those films, and I said I had no objection to their use as long as they are marked and left in the courtroom afterwards.
THE COURT: Thank you, Mr. Gaylord.
MR. SIRRIDGE: Can everybody see?
THE COURT: Hold up a minute, Mr. Sirridge, until we get our record established.
Go ahead.
MR. SIRRIDGE: Can everybody see? I'm going to flip this on.
BY MR. SIRRIDGE:
Q. Dr. Fuhrman, I'm just going to let you take your teaching films and explain to the jury why you use them and what they are useful for in teaching. I'll stay out of the way.
A. Chest radiographs in my experience are

very foreign to the first year medical students. They are very difficult to look at, very difficult to see the structures on the normal chest radiograph anatomy. And over the years --

MR. GAYLORD: Would it be better for him to be on this side?

COURT REPORTER: Yes, it would be helpful. Thank you.

THE WITNESS: And over the years, I have developed sets of teaching films to teach medical students, both first, second and fourth-year levels.

MR. GAYLORD: Excuse me, Doctor. I notice that the films that you're using for demonstrative purposes look like they have letters and numbers on them, and I would ask for our record that you make use of those. When you are talking about one, tell us if it's E3 or 2 or 1, if you wouldn't mind?

THE WITNESS: Yes. I have no problem with that.

MR. GAYLORD: Thank you.

THE WITNESS: Basically, what I'm going to show you is a normal set of chest radiographs. We are able to copy radiographs, and that is

exactly what I have done. E1 is exactly the same film as E2. it's a copy done in our department. E3 is a copy -- excuse me, E4 is a copy of E3. So, these are the exact same chest radiographs.

On the copy films, I have taken the liberty of drawing anatomic structures which I use to teach my medical students chest radiology.

We have two projections in chest radiology. One we call posterior-anterior, which is abbreviated PA, and that is the direction of the x-ray beam through the patient of a film.

So if this were the film cassette, the patient would turn, stand like this. The x-ray beam would go from posterior to anterior to the film and that is a PA projection.

When we display the films, we turn it around because these are the standard ways we project films. So, when you are looking at this woman's film pretend that she is standing and looking at your.

So, this is the patient's left side. This is the patient's right side.

So, pretend this woman is looking at you and standing just like I'm standing, looking at you, and that is a PA projection, and that

projection is a required projection for all chest radiographs.

The other projection we call a lateral projection. And on a lateral projection, the patient puts his or her left side against the film, and the beam goes in sideways, from the right side to the left side, and the exposure is then made. And we are looking at the patient in a 90 degrees opposite projection.

And that is very necessary because we are taking the three-dimensional human body and reducing it to two dimensions. So, to really appreciate three dimensional structures of organs, we need to have the complimentary posterior-anterior and lateral projections.

And these would be the standard radiographs on an outpatient coming for an chest radiograph.

Now, in an ICU setting, when a patient is unable to stand or is bed-bound, we will sometimes only do the one projection because we cannot usually get a lateral projection in those patients.

Q. All right. Doctor, with that as background, I'm going to bring over here the chest

x-rays and CT scan from Mr. Williams. And we are going to take down maybe these two and use the middle part for the x-rays. And I will hand them to you.

A. All right.

Q. Do you recall, Dr. Fuhrman, when Mr. Williams had his first chest x-ray?

A. I believe it was in 1984.

Q. I'll stack those down there, Doctor, and let you take the '84 film and put it up and explain to the jury what your views on that film are.

A. This was -- excuse me.

Q. That was in 1984?

A. This is in 1984.

Q. Can you recall why this particular chest film was taken in 1984?

A. I believe he was having a pre-op chest radiograph was because of the hernia repair on abdominal abscess or something of that effect.

Q. Okay.

A. Things look black and white on chest radiographs of the content of air. The lungs look very black in chest radiology because they are filled with air. So, things that are very black are air containing structures.

The white capacity in the middle of the film represents the heart. The white capacity --

Q. Excuse me. You used the term capacity. What does that mean?

A. Capacity means a white shadow on a chest x-ray. We can see over here a capacity I represent to be the aorta, which is the main blood vessel leading to the heart supplying the chest and the abdomen.

On the lateral projection, we can see a black tubular column of air. I think it stands out particularly well here, which is exactly similar to the normal finding, and that represents the trachea which is your windpipe which is the structure which conducts air from your mouth down into your thorax, into your chest.

If I were looking at Mr. Williams' film in 1984, this is a normal chest radiograph for his age.

Q. All right. Would you try the next one? This is from 1986?

A. This is from March 4th of 1986. I believe this chest x-ray was obtained because he was symptoms of a cough at that time. The chest x-ray remains normal. There are some very minor

changes. One is you can see a white line over here. This represents thickening of the fissure between the right upper lobe and the right middle lobe.

Your right lung has three lobes. Your left lung has two lobes. And the fissures are the separation between the lobes.

We also see a little degree of blunting of the costophrenic angle, and I would consider that within the realm of normal. And I don't give any particular significance to that.

Q. Is there anything unusual about this?

A. This is gas. Again, black things are often air-containing structures. That is gas within the portion of the colon known as the splenic flexure of the colon. And that can change depending, whenever, depending how much gas there is in the colon on any particular day. That is a normal finding.

Q. What about the lateral film?

A. The lateral film is 100 percent normal. Again, I don't talk about mild degenerative changes in the thoracic spine. Those are aging features that we all experience as we get older.

But there's a very important anatomic

landmark on the lateral projection here, and it's this white line which you see right over here. It is a thin white line measuring approximately one to two millimeters in diameter.

And if we go back to our normal chest film, that white line is an important anatomic landmark in the lateral projection. And you can see that very thin white line over here. That is a normal structure. And that is a very important structure. The reason we see it as a white line is that there is air in the lung behind it and air in the tracheal-branchial tree in front of it.

So, that whiteness, that thin white line, represents the thickness of the posterior-tracheal wall, extending into the right bronchus.

We call that line the posterior-tracheal stripe. It's a very important anatomical landmark on a lateral projection of the chest.

Q. Doctor, when was the next film?

A. The next film was in October 28th, 1991.

Q. Can you recall why this chest x-ray was taken?

A. I believe this chest x-ray -- this chest x-ray was taken because the patient was having cough and the patient also was having hemoptysis,

which means they were expectorating blood-tinged sputum.

Q. All right. Can you tell the jury what this x-ray shows?

A. This set of films demonstrates the very importance of having the two projections because the PA projection in this case is normal.

Unfortunately, I believe that his lateral projection is abnormal at this time, which I'll try to demonstrate to you.

We are going to take a look at that white line again. There it is sitting right over here. As we follow the white line up, it stops at the tip of my finger. And there is a small soft tissue which means it's gray, instead of being black; abnormality on the lateral chest radiograph. This is an abnormal lateral chest radiograph.

Q. Doctor, when you say an abnormal radiograph, what are the possibilities that that could be?

A. At this time, that radiograph, I would have to consider the possibility of both benign and malignant lung cancers.

Q. And this is October of 1991?

A. Correct.

Q. And what is the next one, Doctor?
A. The next one is 1/23/96.
Q. There was nothing between 1991 and 1996?
A. That's correct.
I should note that this is labeled 1/22/96 with this yellow tape, but the actual print says 1/23/86. So I believe that they might have put the wrong sticker for the date here. And I think the correct date is 1/23/96.
Q. Okay. Could you tell the jury, Dr.Fuhrman, what your review of this chest film is?
A. We now have a very abnormal PA lateral projections of the chest.
I think one of the things that we can look at is the hilum. The hilum are the structures which connect the center of a chest to the lungs. They include bronchi, lymph nodes, and blood vessels.
And each side should be about the same size and density. And if we take a look at the size of a right hilum, it's a little bit larger. Also, the right paratracheal stripe is thickened.
So, I think we have some very subtle abnormalities in the region of the right hilum on the PA projection.

More importantly, on the lateral projection where all of you saw before that thin white line. It is completely obliterated above this point at the tip of my pointer. We no longer have any white line.

And that tells me that something has replaced that white line and made it grow thicker. And in my experience that is usually a tumor. It's usually a malignant tumor at this point.

Q. Doctor, now this is January of 1996?

A. I think it's also important to mention that that minor thickening of the minor fissure and that minimal blunting of the right costophrenic angle is unchanged over five years, which supports my initial contention that those were insignificant findings.

Q. All right. After January of '96, Doctor, when was the next chest x-ray done?

A. It was done only one month later, and it was because whoever interpreted the films on the first one -- I think you can see there are little marks, question, an abnormality of a right apex. I believe that is a normal finding, and if I were reading that film I would not have questioned any abnormality.

But since the abnormality was questioned on the report, a follow-up radiograph was obtained.

Q. Let me also ask you, Doctor, did Mr. Williams report any symptoms in early '96?

A. I believe he was again having cough and hemoptysis which had been going on since October and November of the preceding year.

Q. Of 1985, of the preceding -- or of 1995?

A. 1995.

Q. Sorry. Thank you.

All right. Could you explain to the jury what this shows?

A. Well, this is only four weeks later. There's no dramatic change. Again, we can see the abnormal density of the right hilum, an abnormal thickness of the right paratracheal region.

Also, on the lateral projection, our landmark posterior tracheal stripe is obliterated. And I don't think there's any real change from that film from a month ago.

Both projections are very abnormal, but there is no change from the study of one month earlier.

Q. All right. Doctor, when were the next chest x-rays done on Mr. Williams?

A. The next set of chest x-rays were done on September 26 of 1996. And you can see over here the findings of the abnormal soft tissue, meaning abnormal whiteness, in the right paratracheal region. This black tubular structure represents the tracheal area column.

And on the lateral projection, we can see again complete obliteration of any white line.

And, very importantly, we can also see now a black hole, which I think you can see right here. That is the origin of the left upper lobe bronchus, and we call this on radiology the completed doughnut sign, meaning a soft tissue tumor has gone under it. And that tells me, as a radiologist, that we already have subcarinal, subcarinal disease, subcarinal tumor.

Q. Hold on just a second. Doctor, let me ask you, you're using terms here, and I think this exhibit which has been previously seen by the jury, defense Exhibit 919, might help the jury appreciate what area you are talking about here. I'll hold it.

A. The subcarinal region is this set of lymph nodes here which lives directly under the area of bifurcation of the trachea. Basically, the

trachea changes its name when it divides, and we now call these bronchi. This is the area that has abnormal soft tissue, and on the frontal projection these nodes here are abnormally enlarged.

Q. Let me ask you, Dr. Fuhrman, these changes which you were discussing and describing, in September of 1996, is that in the same area similar changes to what you saw in early '96?

A. It's exactly the same area; although, it is much larger.

Q. What about the changes, the abnormalities which you saw originally in October 1991; is that in any way related to what you are seeing here in '96?

A. Yes.

Q. Okay. And how do you know or what is your view as to why it is related?

A. It's in the exact same anatomic location, and I think it's fair to interpret the film as something that grew in this region rather than something that went away and then a new thing coming back.

Q. All right. Now, Doctor, have you also looked at the chest films which occurred after September of 1996?

A. Yes, I have.
Q. And can you summarize those chest films?
A. The patient was started on a good course of chemotherapy consisting of two chemotherapeutic drugs for two months, two cycles, and then was treated with radiation, and the size of the tumor mass decreased. And he did have a -- what I would consider a good response to chemotherapy and radiation therapy for surgery non resectable lung tumor.
MR. SIRRIDGE: Thank you, Doctor.
This would be a very convenient time to break, Your Honor.
THE COURT: All right.
Jurors, we'll resume at -- is 1:30 going to work for you? We are going to resume at 1:30. So, please leave your notes here. Don't discuss the case. Watch your step coming out, and we'll continue after lunch.

* * *

(Whereupon, after the jury exited the courtroom, the proceedings continued, as follows:)

* * *

THE COURT: Mr. Gaylord, are you able to see all right when the witness is testifying

there? You look like it's not.
MR. GAYLORD: I'm struggling with some of the things he's pointing out.
THE COURT: Well, why don't we work for a minute on figuring out a better place for you to be or maybe even changing the angle of this board a bit.
MR. GAYLORD: Maybe back a bit would help, I think.
MR. SIRRIDGE: Let's try that and see how that is.
THE COURT: Because I know you need to see. So, I want to be sure we get you to a place where you can. All right.
MR. GAYLORD: How much more are you going to do with these?
MR. SIRRIDGE: Probably ten minutes, at the most.
THE COURT: Anything for the record at this point?
MR. SIRRIDGE: Not from me.
MR. GAYLORD: No.
THE COURT: Okay. Thanks very much.

* * *

(Whereupon, the a.m. proceedings adjourned.)

STATE OF OREGON)
) SS.
County of Multnomah)

I, Jennifer Wiles, hereby certify that I am an Official Court Reporter to the Circuit Court of the State of Oregon for Multnomah County; that I reported in Stenotype the foregoing proceedings and subsequently transcribed my said shorthand notes into the typewritten transcript, pages 1 through 91, both inclusive; that the said transcript constitutes a full, true and accurate record of the proceedings, as requested, to the best of my knowledge, ability and belief.

Dated this 15th day of July, 1999 at Portland, Oregon.

_____
Jennifer Wiles
Official Court Reporter